

## 2001 Chevrolet S10 Pickup

2000-01 CLUTCHES Trucks - Except Tracker

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## APPLICATION

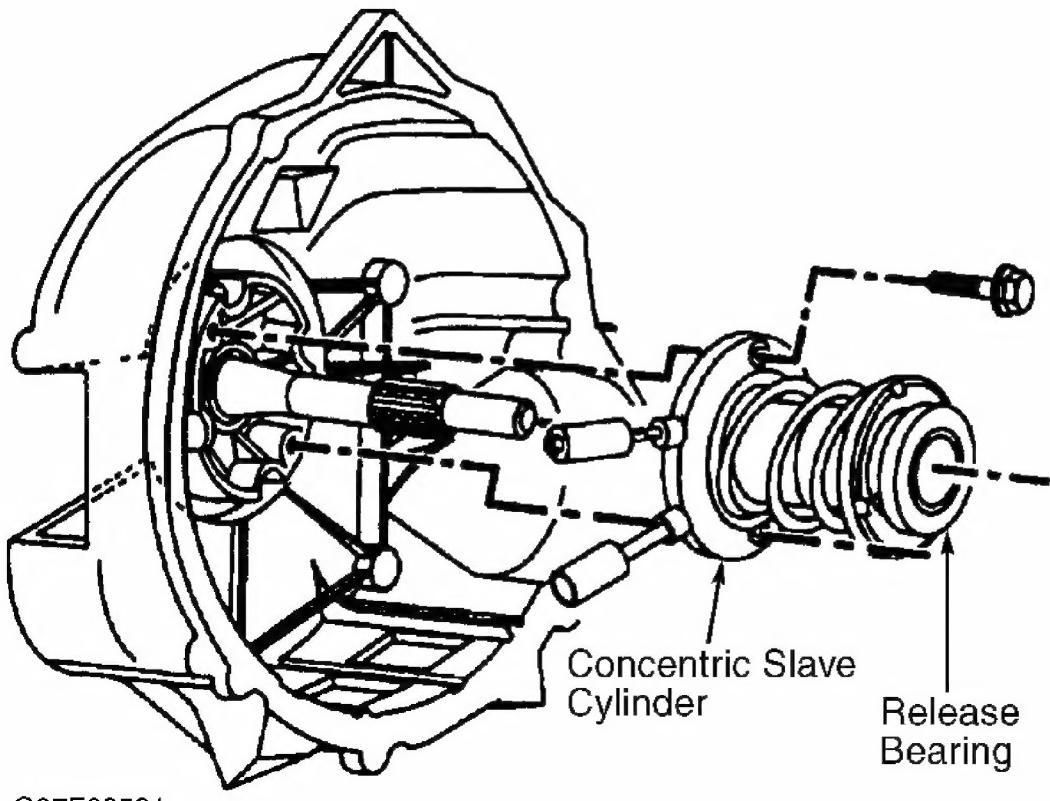
### MANUAL TRANSMISSION APPLICATIONS

Application	Transmission Model (RPO Code)
Blazer & Jimmy	NV3500 (M50)
Cab & Chassis, & Pickup	NV4500 (MW3)
S10 Pickup & Sonoma	
2.2L	NV1500 (MW2)
4.3L	NV3500 (M50)
Silverado & Sierra	
1500	NV3500 (MG5)
2500	NV4500 (MW3)
2500 HD & 3500	
6.0L	NV4500 (MW3)
6.6L & 8.1L	S6-650 (ML6)

## DESCRIPTION & OPERATION

The hydraulic clutch system consists of a clutch plate, pressure plate, release bearing and pilot bearing. Hydraulic clutch has a master cylinder with reservoir. Clutch pedal moves master cylinder push rod which activates a concentric slave (actuator) cylinder located in transmission bellhousing, which moves the release bearing. See [Fig. 1](#).

Hydraulic clutch system provides automatic clutch adjustment. No adjustment of clutch linkage or pedal position is required. Master cylinder, hydraulic line and actuator cylinder assembly is furnished pre-filled and pre-bled.



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**Fig. 1: Identifying Concentric Clutch Slave Cylinder**  
Courtesy of GENERAL MOTORS CORP.

## BLEEDING

**CAUTION: Do not reuse fluid bled from system. Fluid may be aerated or contaminated. Ensure no air is drawn into clutch hydraulic system during bleeding procedure.**

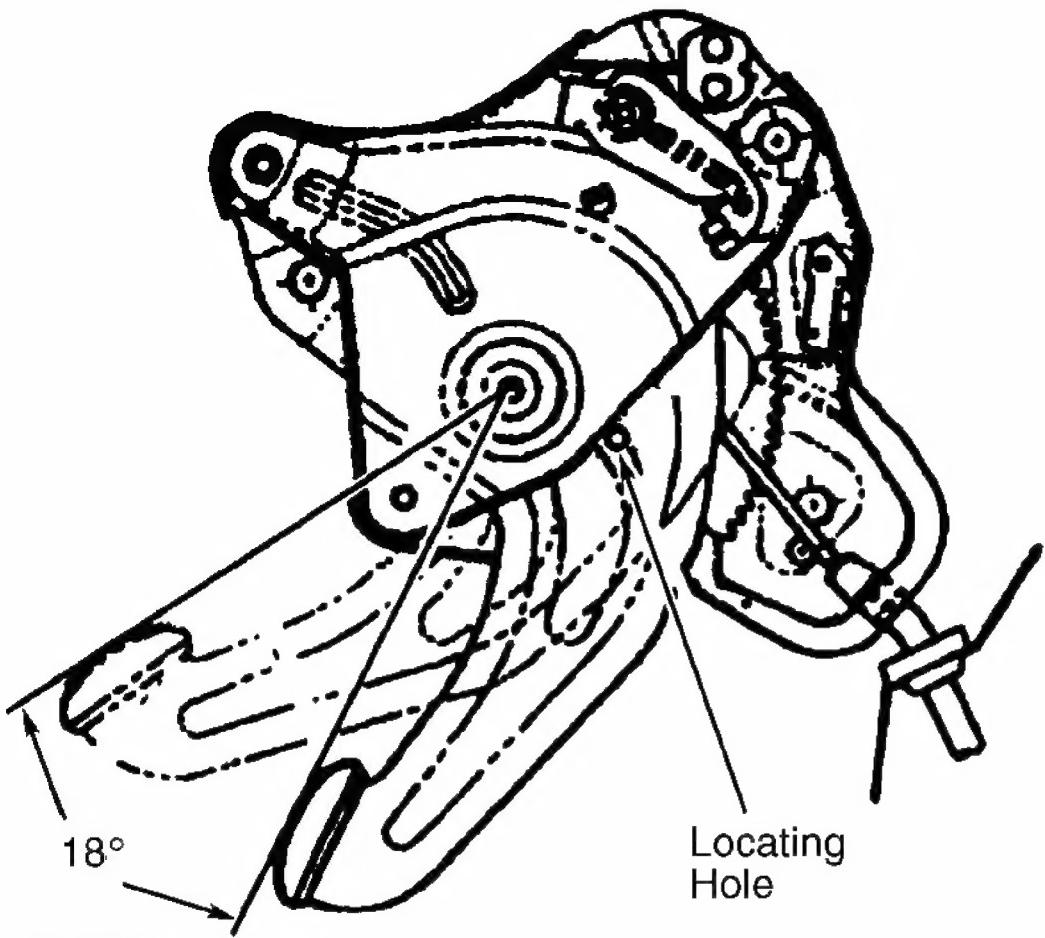
1. Clean and remove reservoir cap. Top-off reservoir with NEW DOT 3 brake fluid.
2. Have assistant depress and hold clutch pedal. Open bleed screw located on left side of transmission to expel air. Close bleed screw and release clutch pedal.
3. Repeat procedure until all air is out of system. Check and refill reservoir as necessary during bleeding. After bleeding, pump clutch pedal several times. If clutch engagement is not satisfactory, repeat bleeding procedure.
4. If normal bleeding procedure is unsuccessful, remove reservoir cap. Pump pedal quickly for 30 seconds, and then stop to allow air to escape. Repeat procedure as necessary.

## ADJUSTMENTS

**NOTE:** The hydraulic clutch system provides automatic clutch adjustment. No manual clutch adjustments are necessary.

### DRIVE SHAFT PARKING BRAKE ("C" & "K" SERIES)

Raise and support vehicle. Loosen adjusting nut at equalizer. Set parking brake by pushing pedal down 18 degrees. Insert a .125" (3 mm) pin into locating hole in pedal assembly. See Fig. 2. Push pedal down until pin contacts parking brake outer flange. Install Tension Scale (J-35999), with small length of cable or chain, and a tightening device (turnbuckle) on frame. Install a small chain on lever near spring on bottom of lever and tighten until tension scale is at 50 lbs. (23 kgs.). Turn clevis until pin slides freely in lever with all slack removed from cable. Install clevis pin and cotter pin. Remove tension scale and extensions used. Release parking brakes and rotate rear wheels. Ensure no drag exists. Lower vehicle.



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**Fig. 2: Identifying Brake Adjustment Locating Hole ("C" & "K" Series)**  
Courtesy of GENERAL MOTORS CORP.

## **TROUBLE SHOOTING**

**NOTE:** For trouble shooting not covered in this article, see appropriate table in TROUBLE SHOOTING article in GENERAL INFORMATION.

Hydraulic system should not require additional fluid under normal circumstances. Reservoir fluid level will increase as normal clutch wear occurs. Avoid overfilling or removing fluid from reservoir. This will cause clutch release problems.

Apply parking brake. Block vehicle wheels. Shift transmission into Neutral. Start engine and run at idle. Engage, and then disengage clutch. Wait 9 seconds. Shift transmission into Reverse. If grinding noise is heard, see appropriate table in TROUBLE SHOOTING article in GENERAL INFORMATION.

## **REMOVAL & INSTALLATION**

**WARNING:** Deactivate air bag system before performing any service operation. See appropriate AIR BAG RESTRAINT SYSTEMS article in ACCESSORIES & EQUIPMENT. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

**CAUTION:** When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

## **TRANSMISSION**

**NOTE:** Do not disassemble transmission shift housing. Opening shift housing voids warranty. Also, internal parts for shift housing are not available.

### **Removal ("C" & "K" Series)**

1. Disconnect negative battery cable. Shift transmission into 3rd or 4th gear. Remove shift lever retainer screws and retainer. Remove 8 screws attaching shift boot and insulator to floor panel. Remove retainer and shift boot from shift lever. Remove shift lever.

## 2001 Chevrolet S10 Pickup

### 2000-01 CLUTCHES Trucks - Except Tracker

Remove shift housing. Raise and support vehicle. Drain transmission fluid.

2. Mark drive shaft(s) for reassembly reference. Remove drive shaft(s). Remove exhaust crossover pipe. On 4WD models, remove transfer case shield. Drain oil from transfer case. Remove vent hose and electrical connectors. Remove transfer case shift linkage. Using jack, support transfer case. Remove transfer case and discard transmission adapter gasket.
3. On vehicles equipped with drive shaft parking brake, release parking brake. Raise and support vehicle. Remove nut and washer from center of brake drum. Remove drum yoke assembly, bolts, washers and drum yoke. Remove cotter pin, clevis pin, clevis and nut from brake cable. Remove parking brake cable grommet, and cable from bracket.
4. On all models, disconnect electrical connectors from speed sensor and back-up light switch. Remove wiring harness retainers from transmission. Using Clutch Line Removal Tool (J-42371), remove clutch line from concentric slave cylinder quick-connect coupling. Remove starter and clutch housing cover. Remove transmission vent hose.
5. Remove bolts securing transmission-to-engine cover. Remove rear transmission mount. Support transmission. Remove transmission-to-engine bolts and studs. Pull transmission straight back on clutch hub splines. Remove transmission.

#### Installation

1. To install, reverse removal procedure. If equipped with drive shaft parking brake, adjust parking brake. See **DRIVE SHAFT PARKING BRAKE ("C" & "K" SERIES)** under ADJUSTMENTS. On 4WD models, install NEW transmission adapter gasket.
2. On all models, lightly coat input shaft splines with high-temperature grease. Tighten bolts to specifications. See **TORQUE SPECIFICATIONS**. Fill transmission and transfer case with appropriate lubricant. See appropriate MANUAL TRANSMISSION article in TRANSMISSION SERVICING.

#### Removal ("S" & "T" Series)

1. Disconnect negative battery cable. Shift transmission into 3rd or 4th gear. Remove shift lever knob and nut. Remove shift lever retainer screws and retainer, if equipped. Remove shift lever boot mounting screws and boot. Remove shift lever and nut.
2. Remove exposed bolts on base of housing. DO NOT remove bolts under rubber boot at top of housing. Remove shift lever housing. Raise and support vehicle. Drain transmission fluid. Remove parking brake cable for clearance. Mark drive shaft(s) for reassembly reference. Remove drive shaft(s).
3. Disconnect electrical connectors from speed sensor and back-up light switch. Disconnect wiring harness retainers from right side of transmission. Disconnect exhaust pipe from exhaust manifold. Remove catalytic converter and hanger. If equipped, remove right and left side transfer case-to-transmission braces. On 4WD models, place

transfer case in 4H position. Remove skid plate. Drain fluid from transfer case. Disconnect vacuum lines and electrical connectors from transfer case.

4. Disconnect shift cable from transfer case. Support transfer case with jack. Remove transfer case-to-transmission mounting bolts. Slide transfer case rearward until free of transmission output shaft. Lower and remove transfer case. Remove and discard gasket. On all models, using Clutch Line Removal Tool (J-42371), remove clutch line from concentric slave cylinder quick connect coupling.
5. Remove clutch housing cover. Remove clutch plate and clutch cover from flywheel. Support transmission. Using a fuel pressure gauge, purge fuel system. Disconnect fuel lines. Remove fuel lines and retainers from rear crossmember. Remove rear crossmember. Move wiring harness away from transmission oil pan.
6. Lower transmission enough to gain access to top of transmission. Remove wiring harness from front crossmember. Remove engine block ground. Remove transmission mounting bolts as necessary. Pull transmission straight back on clutch hub splines, and remove transmission.

#### Installation

To install, reverse removal procedure. On 4WD models, install NEW transmission adapter gasket. On all models, lightly coat input shaft splines with high-temperature grease. Tighten bolts to specifications. See **TORQUE SPECIFICATIONS**. Fill transmission and transfer case with appropriate lubricant. See appropriate MANUAL TRANSMISSION article in TRANSMISSION SERVICING.

#### CLUTCH ASSEMBLY & PILOT BEARING

**WARNING: Do not use compressed air to clean clutch parts. Dust is harmful when inhaled.**

#### Removal ("C" & "K" Series)

1. Raise and support vehicle. Remove transmission. See **TRANSMISSION**. Install Clutch Alignment Tool (J-5824-01) to support clutch plate. Mark flywheel and pressure plate for reassembly reference. See **Fig. 3**.
2. Evenly loosen pressure plate bolts 1-2 turns at a time until pressure plate spring tension is released. Remove clutch plate and pressure plate. Remove clutch aligner using Pilot Bearing Puller (J-43276). Remove pilot bearing if worn or damaged. Remove concentric slave cylinder and release bearing. See **CONCENTRIC SLAVE (ACTUATOR) CYLINDER**.

#### Inspection

1. Clean all components with water-dampened cloth to remove asbestos fibers. Clean flywheel housing with solvent. Release bearing is permanently packed with lubricant

## 2001 Chevrolet S10 Pickup

### 2000-01 CLUTCHES Trucks - Except Tracker

and should not be cleaned with solvent.

2. Inspect all components for wear or damage. Inspect all contact surfaces for scoring, warping and damage. Inspect friction surfaces for excessive oil. Inspect splines for nicks, burrs and sliding fit.

#### Installation

1. Install NEW pilot bearing into flywheel, if removed. Install clutch aligner to support clutch plate. Install clutch plate and pressure plate onto flywheel. Ensure reference marks are aligned. If installing NEW clutch plate and pressure plate, align lightest part of clutch cover (identified by a Yellow dot) with heaviest part of flywheel (identified by an "X").
2. Install and tighten NEW spring washers and bolts evenly to avoid distortion. Remove clutch aligner.
3. Lubricate O.D. groove and pack grease into I.D. recess of release bearing. To complete installation, reverse removal procedure. Tighten bolts to specifications. See **TORQUE SPECIFICATIONS**. Fill reservoir with fluid, and bleed system. See **BLEEDING**.

#### Removal ("S" & "T" Series)

1. Raise and support vehicle. Remove transmission. See **TRANSMISSION**. Remove slave cylinder and release bearing. Install Clutch Aligner (J-33169) to support clutch plate. Mark flywheel, clutch plate and pressure plate for reassembly reference.
2. Evenly loosen pressure plate bolts 1-2 turns at a time until clutch plate spring tension is released. Remove clutch plate and pressure plate. Remove clutch aligner. Using Pilot Bearing Puller (J-43276), remove pilot bearing if worn or damaged.

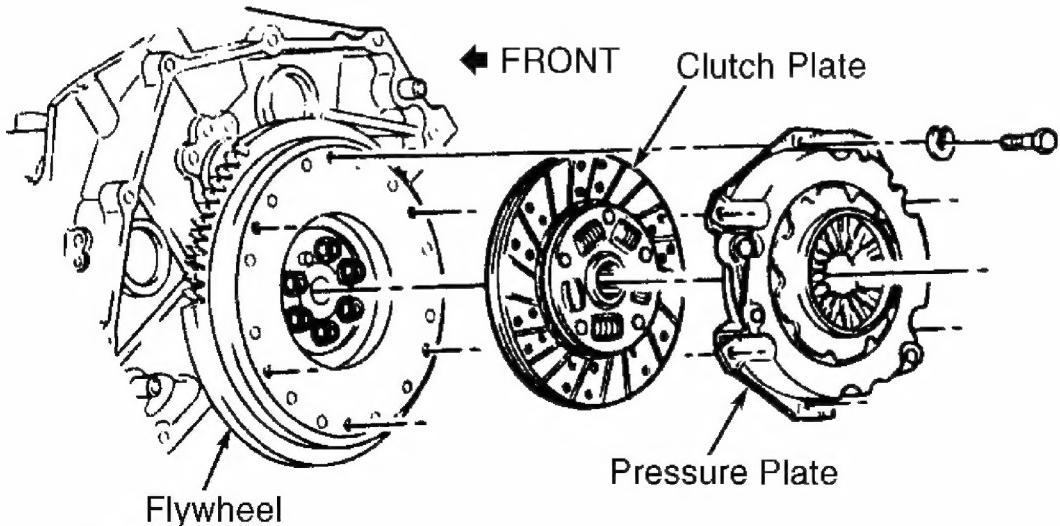
#### Inspection

1. Clean all components with water-dampened cloth to remove asbestos fibers. Clean clutch fork, bellhousing and ball stud with solvent. Release bearing is permanently packed with lubricant and should not be cleaned with solvent.
2. Inspect all components for wear or damage. Inspect all contact surfaces for scoring, warping and damage. Check clutch plate runout. Runout must not exceed .200" (5.08 mm). Inspect friction surfaces for excessive oil. Inspect splines for nicks, burrs and sliding fit.

#### Installation

1. Using suitable clutch pilot bearing installation tool, install NEW pilot bearing into flywheel, if removed. Lubricate pilot bearing with machine oil. Install Clutch Aligner (J-33169) to support clutch plate. Install clutch plate and pressure plate to flywheel. Ensure reference marks are aligned.
2. Install and tighten NEW spring washers and bolts evenly to avoid distortion. Remove

clutch aligner. To complete installation, reverse removal procedure. Tighten bolts to specifications. See **TORQUE SPECIFICATIONS**. Fill reservoir with fluid, and bleed system. See **BLEEDING**.



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**Fig. 3: Exploded View Of Clutch Assembly**  
Courtesy of GENERAL MOTORS CORP.

### CLUTCH START SWITCH

Remove left side instrument panel sound insulator panel. Remove plastic retainer tabs from clutch switch. Disconnect electrical connector and remove clutch switch from master cylinder push rod. To install, reverse removal procedure.

### CLUTCH MASTER CYLINDER & RESERVOIR

**NOTE:** **Master cylinder is serviced as an assembly with master cylinder reservoir and tubing. Replacement of individual components cannot be performed. A complete pre-filled, pre-bled master cylinder assembly must be installed.**

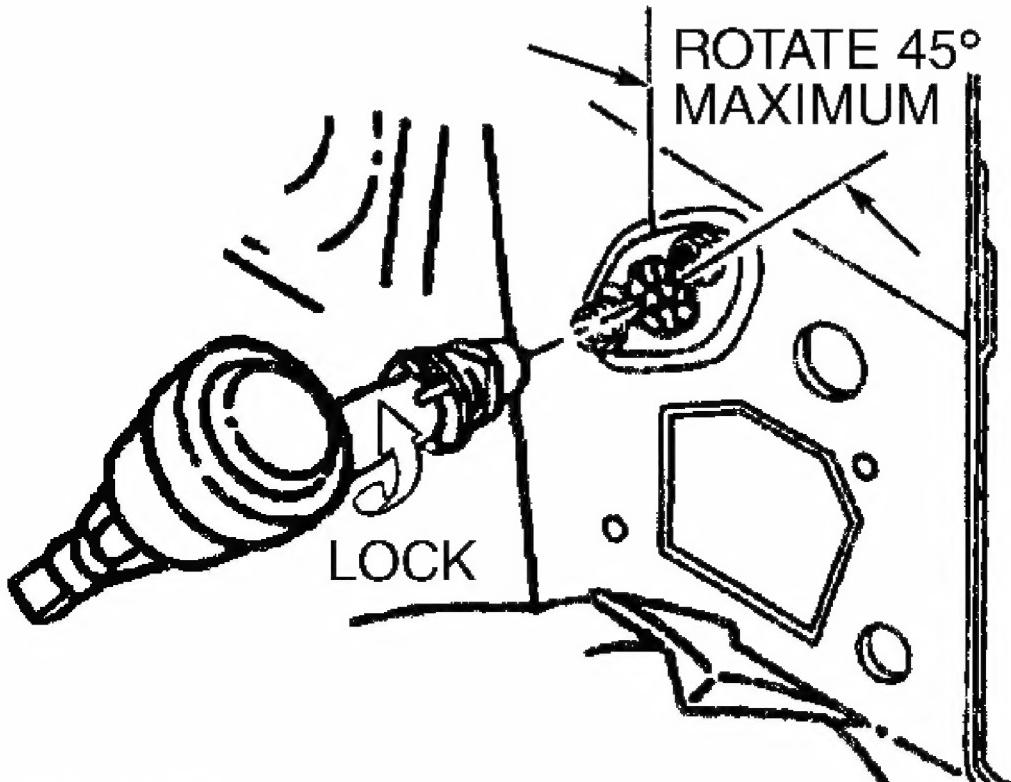
#### Removal

Disconnect negative battery cable. Separate push rod from clutch pedal. On "C" and "K" series, use Quick Connect Disengagement (J-36221) to remove hydraulic line from concentric slave cylinder at transmission. On "S" and "T" series, use Clutch Line Release (J-36221) to remove hydraulic line from concentric slave cylinder at transmission. On all models, remove line clips from wiring harness bracket and sheet metal. Rotate master

cylinder body 45 degrees clockwise, and remove from cowl panel. See Fig. 4.

#### Installation

To complete installation, reverse removal procedure. Tighten bolts to specifications. See **TORQUE SPECIFICATIONS**. Top off reservoir with fluid, and bleed system. See **BLEEDING**.



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**Fig. 4: Master Cylinder Removal**  
Courtesy of GENERAL MOTORS CORP.

#### CONCENTRIC SLAVE (ACTUATOR) CYLINDER

##### Removal & Installation

Using Clutch Line Removal Tool (J-42371), depress White plastic sleeve to separate coupling. Protect both halves of coupling to prevent contamination. Remove transmission. See **TRANSMISSION**. Remove bolts securing concentric slave cylinder to clutch housing shaft. Remove slave cylinder assembly from transmission input shaft. Remove release

## 2001 Chevrolet S10 Pickup

2000-01 CLUTCHES Trucks - Except Tracker

bearing from slave cylinder. To install, reverse removal procedure.

## OVERHAUL

**NOTE:** All master and concentric slave (actuator) cylinders are serviced as an assembly. Rebuilding or overhaul is not possible.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS ("C" & "K" SERIES)

Application	Ft. Lbs. (N.m)
Crossmember Bolt	37 (50)
Mount-To-Transmission Bolt	
NV3500	37 (50)
NV4500	40 (54)
Oil Fill Plug (NV4500)	27 (37)
Oil Fill & Drain Plug (NV3500)	22 (30)
Parking Brake Yoke Shaft Nut (NV4500)	325 (441)
Pressure Plate-To-Flywheel Bolt	30 (41)
PTO Cover Bolt (NV4500)	30 (41)
Shift Housing Bolt (NV3500)	15 (20)
Shift Lever Nut	35 (47)
Support Bracket Bolt	74 (100)
Transmission-To-Engine Bolt	37 (50)
	INCH Lbs. (N.m)
Clutch Housing Cover Bolt	106 (12)
Concentric Slave (Actuator) Cylinder Bolt	71 (8)
Shift Boot/Insulator Screw	18 (2)
Shift Housing Bolt (NV4500)	89 (10)

### TORQUE SPECIFICATIONS ("S" & "T" SERIES)

Application	Ft. Lbs. (N.m)
Clutch Housing-To-Engine Bolt	30 (41)
Mount-To-Crossmember Nut	33 (45)
Mount-To-Transmission Bolt	37 (50)
Pressure Plate-To-Flywheel Bolt	
NV1500	33 (45)
NV3500	29 (39)
Shift Housing Bolt	15 (20)
Shift Lever Nut	35 (47)

**2001 Chevrolet S10 Pickup**

2000-01 CLUTCHES Trucks - Except Tracker

	<b>INCH Lbs. (N.m)</b>
Oil Drain & Fill Plug	22 (30)
Transmission-To-Engine Stud	35 (47)
	<b>INCH Lbs. (N.m)</b>
Clutch Housing Cover Bolt	120 (14)
Concentric (Actuator) Slave Cylinder Bolt	71 (8)
Reservoir Bolt	27 (3)
Shift Boot/Insulator Screw	18 (2)